

**ENDANGERED SPECIES SUBPERMIT
ANNUAL REPORT**

Myotis sodalis & Myotis grisescens

**JEFFERSON PROVING GROUND
1998 -1999**

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INTRODUCTION

During 1998 and 1999, the U.S. Fish and Wildlife Service (Service) staff at Jefferson Proving Ground (JPG) conducted mist net studies of bats to monitor use of this closed military installation by Federally endangered, Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*). A requirement of the endangered species subpermit (Subpermit No. 98-11, Issued May 21, 1998) obtained to do the study was the preparation of an annual report. The following summary of our combined results from 1998 and 1999 is submitted to fulfill this requirement.

METHODS

Mist nets were placed at riparian sites previously used by Bloomington Field Office (BFO) staff from 1993-1995 and additional likely bat foraging sites on JPG. Mist nets were placed in travel lanes of bats in probable foraging locations above water/ground and below the tree canopy. Nets were opened (i.e., set for capture) at dusk and checked every 20 minutes to remove captured bats until approximately 0100 hr. Mist netting was restricted to nights with no wind or slight breezes and no precipitation. Bats were held as briefly as possible during data collection and radiotagging.

Data on sex, age, reproductive status, and weight of all Indiana bats captured was recorded. Reproductive status of females was classified as pregnant, lactating, non-lactating, post-lactating or young of the year. Wing punches for genetic sampling were taken using region wide guidelines. Radio transmitters (<0.80 g ; Wildlife Materials Inc., Carbondale, IL) were attached with non-toxic skin bond adhesive to adult female or young of the year *M. sodalis* using standard region-wide procedures. Once found, bats were monitored daily until loss or malfunction of transmitter. Young of the year and adult female *M. sodalis* determined to be lactating or postlactating (no pregnant females were caught due to the dates of trapping) were, for the purposes of this study, assumed to return to a maternity roost and all references to roost trees within the report refer to maternity roost trees.

Roost tree characteristics of located bats were measured with methodology similar to Callahan (1993). Tree species, DBH, and height data were collected for each roost tree. Tree health was noted as either dead or alive with percent of exfoliating bark estimated at each cardinal direction. Distance to forest opening was then measured to nearest canopy opening greater than 0.015 hectare. A general canopy closure classification was assigned as either open (<50 % canopy closure) or closed (>50 % canopy closure).

RESULTS

Mist netting was conducted from June 29 to August 11, 1998 and from June 15 to August 13, 1999. A total of 446 bats representing 7 species was captured in the 129 net nights sampled (Table 1). No *M. grisescens* were captured in either year.

Eighteen trapping sites were sampled across JPG with *M. sodalis* captured at 11 (65%) of these sites (Figure 1). *M. sodalis* were captured at 6 of 14 (43%) sites in 1998 and 5 of 9 (56%) sites in 1999. Productive sites and sites of similar habitat conditions to productive sites were surveyed in consecutive years (n=5). *M. sodalis* were captured at the same location in consecutive years at 2 of these 5 sites (40%). A total of 7 *M. sodalis* was captured in 1998 and 13 in 1999 (Table 2). Rate of capture was 0.14 *M. sodalis* per net night (n=49) in 1998 and 0.16 *M. sodalis* per net night (n=80) in 1999 (Figure 2).

Table 1

MIST NET SUMMARY

SPECIES	# CAUGHT (%)	
	1998 49 net nights	1999 80 net nights
<i>Eptesicus fuscus</i>	31 (17)	54 (20)
<i>Lasiurus borealis</i>	30 (17)	89 (33)
<i>Lasiurus cinereus</i>	3 (2)	7 (3)
<i>Myotis septentrionalis</i>	23 (13)	31 (12)
<i>Myotis lucifugus</i>	41 (23)	41 (15)
<i>Myotis sodalis</i>	7 (4)	13 (5)
<i>Pipistrellus subflavus</i>	43 (24)	33 (12)
TOTAL	178	268

FIGURE 1

Myotis sodalis
1998 -99 Mist Net Sites

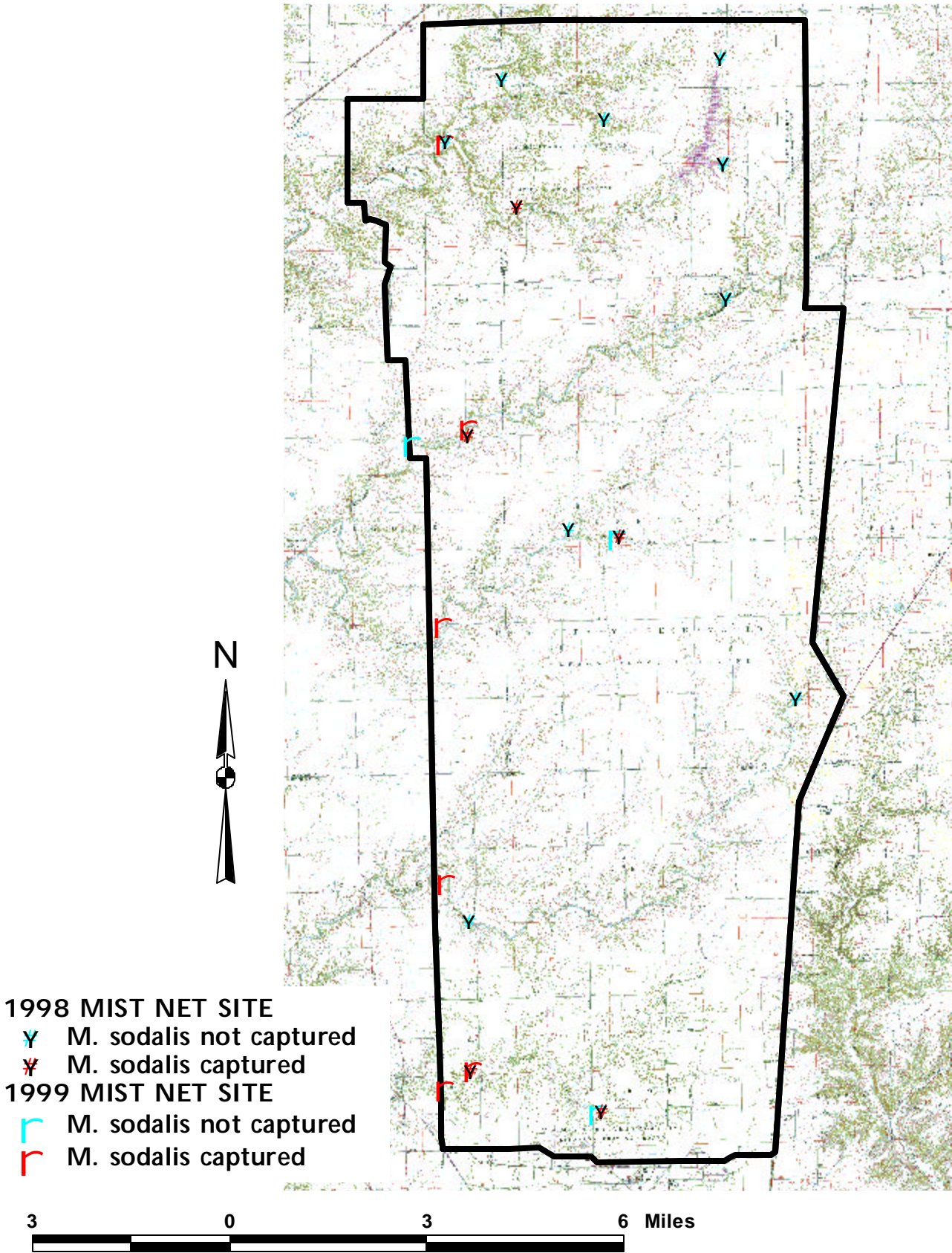


Figure 2

CAPTURE RATE SUMMARY

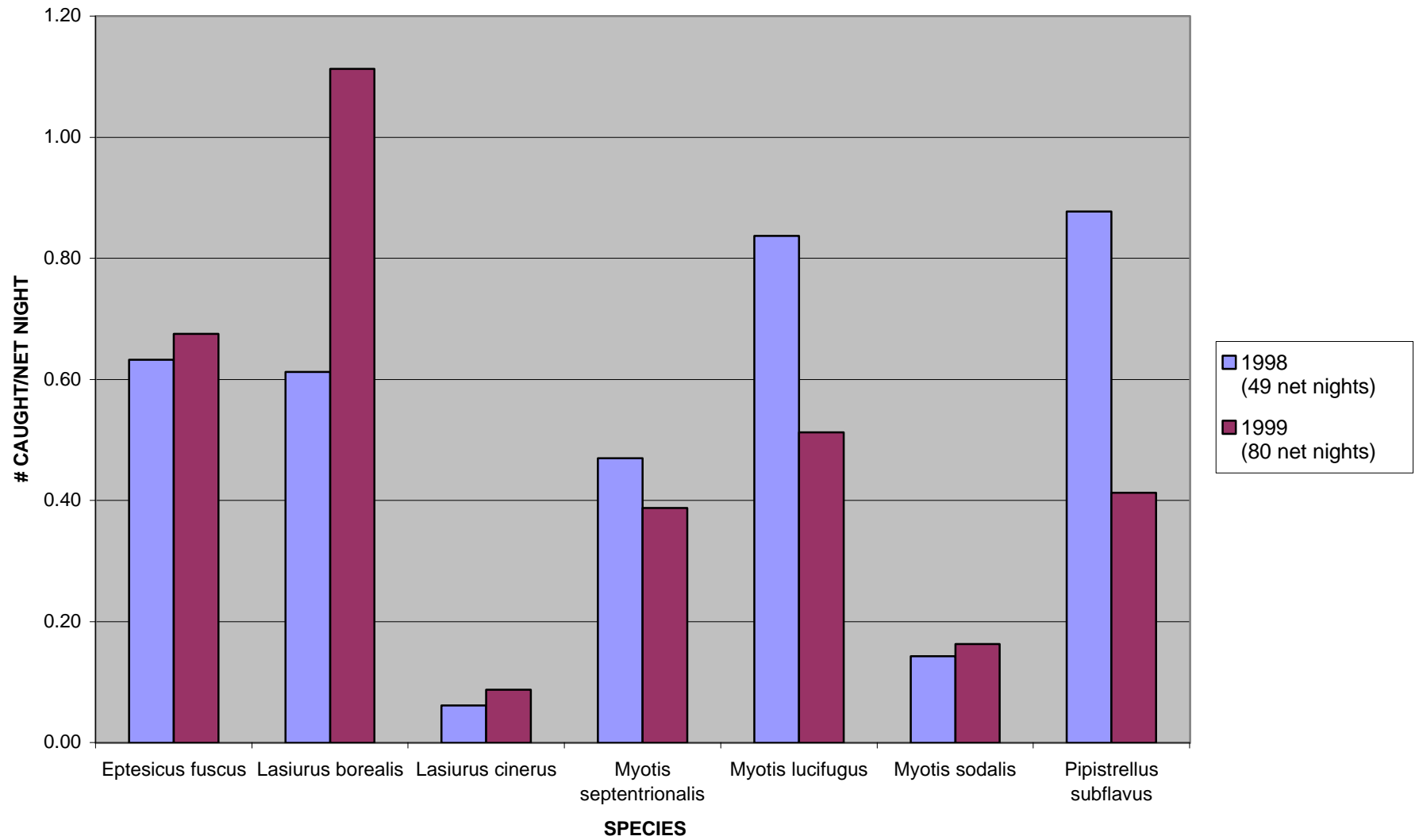


TABLE 2

Myotis sodalis CAPTURE SUMMARY

	CREEK	SEX	AGE (Juv./Adult)	WEIGHT (grams)	HEIGHT (meters)	UP/DOWN STREAM*	TIME	DATE
1998	Middle Fork Creek	F (Lactating)	A	7.5	2.5	UP	8:50	6/29/98
	Middle Fork tributary	F (Lactating)	A	8.5	1	UP	10:53	6/30/98
	Middle Fork tributary	F (Lactating)	A	6.9	6	UP	11:35	6/30/98
	Horse & Poplar Branch	F (Lactating)	A	7	2	UP	11:49	7/6/98
	Little Otter Creek	M	A	6.5	5	UP	11:20	7/13/98
	Falling Timbers Branch	M	A	6.75	4	UP	8:40	7/30/98
	Graham Creek	M	A	7	3	UP	12:40	8/11/98
1999	Middle Fork Creek	F (Lactating)	A	7.5	5	UP	9:20	6/23/99
	Graham Creek	M	A	8	1.5	UP	12:20	7/2/99
	Graham Creek	F (Lactating)	A	7	8	UP	9:40	7/8/99
	Little Graham Creek	M	A	6.5	5	UP	12:40	7/19/99
	Little Graham Creek	F	J	6	3	UP	11:40	7/21/99
	Little Graham Creek	F (Post-lact.)	A	8.5	2.5	UP	12:20	7/22/99
	Little Graham Creek	F	J	7	2.5	DOWN	12:00	7/23/99
	Middle Fork Creek	F (Post-lact.)	A	7	4	UP	11:30	7/26/99
	Middle Fork Creek	F	J	6.5	3	DOWN	11:50	7/26/99
	Big Creek	F (Post-lact.)	A	7.75	9	UP	12:20	8/3/99
	Otter Creek	M	A	7	5	DOWN	9:00	8/9/99
	Otter Creek	M	A	6.5	3.5	UP	11:40	8/12/99
	Otter Creek	M	A	6.5	2	UP	1:00	8/13/99

* Indicates whether bat was caught in upstream or downstream side of net

Two *M. sodalis* were radio tagged in 1998 and 7 in 1999. Mean straight-line travel distance from point of capture to first roost where the bat was located (n=5) was 1490 meters and distances varied from 610 to 3,160 meters (SD=1180). Mean distance from roost to water (n=8) is 620 meters and minimum and maximum distances were 130 & 1,350 meters respectively (SD=380).

Nightly exit counts were conducted for both females in 1998. In 1999, only 3 of the 7 radiotagged females were located. Nightly exit counts were attempted on the 3 located females but we were able to obtain exit counts at only one tree. Of the 3 roost trees identified in 1999, one was within a restricted area but visible from 30 meters away on an access road. Bats were seen exiting this tree but visibility of the tree was not sufficient to allow an actual count. At the second roost tree, bats exited after dusk/dark on the days monitored not allowing an accurate count. Vegetation characteristics around the identified roost trees were measured at the end of the field season (Table 3).

TABLE 3

***Myotis sodalis* Roost Tree Summary**

	Location	Tree Species	Tag #	DBH (cm)	Height (m)	Tree Health Alive/Dead	Exfoliating bark (%)					Distance to		Closed/ Open**	Maximum # of Exiting Bats
							North	East	West	South	Mean	Forest Opening* (m)	Water (m)		
1998	A Road	<i>Ulmus americana</i>	1	36.7	22.86	Dead	20	15	10	7	13	9	430	Open	12
	Middle Fork tributary	<i>Ulmus americana</i>	2	32.7	20.42	Dead	50	50	40	25	41	0	130	Open	12***
	Jinestown Road	<i>Carya ovata</i>	3	40.4	32.31	Live	15	20	15	25	19	12	670	Closed	6
	Jinestown Road	<i>Acer rubrum</i>	4	17.4	11.58	Dead	15	25	25	20	21	0	860	Open	4
	Jinestown Road	<i>Carya ovata</i>	5	34	29.87	Live	60	40	50	40	48	13.5	680	Closed	6
1999	Jinestown Road	<i>Ulmus americana</i>	6	16.6	9.78	Dead	10	10	15	15	13	3	1350	Closed	6
	Jinestown Road	<i>Carya ovata</i>	7	35.9	33.91	Live	40	40	50	50	45	9	260	Closed	Unk
	G Road	<i>Ulmus americana</i>	none	~48	~30	Dead	~10	~10	~10	~10	~10	0	560	Open	Unk
MEAN				32.7	23.4		28	26	27	24	26	6	620		

*Distance to Forest Opening was measured to the nearest canopy opening >.015 ha.

**Closed classification represents >50% canopy cover, Open represents <50% canopy cover.

***This tree had 40 bats exiting on July 31 but the transmitter was no longer functioning. Although it is likely they were *M. sodalis*, there was no way to verify this.

~ This tree is located 30 meters within a restricted area. All measurements listed are estimates taken from a nearby road.

RECOMMENDATIONS

Use of JPG as summer habitat by *M. sodalis* was first documented in 1993. Army funding has made it possible to extensively survey JPG for *M. sodalis* prior to JPG's closure (as an active Army installation) and during the course of the Memorandum of Agreement covering the Service's activities through October 1999. Mist netting efforts by Service personnel from JPG and BFO have documented use of all riparian corridors within JPG by *M. sodalis* as summer habitat.

If current negotiations are successful and JPG becomes a National Wildlife Refuge, it is doubtful staffing and funding would be sufficient to allow the Refuge to conduct 80 net nights of trapping, as was done in 1999, on an annual basis nor would it likely be needed. Management activities associated with the operation of a Refuge should reduce adverse impacts to *M. sodalis* thereby reducing the frequency and/or extent of monitoring. Periodic monitoring should be conducted to detect long term trends in habitat use associated with Refuge management activities and in support of Recovery Plan Research Priorities.

Literature Cited

Callahan, E. V. 1993. Indiana bat summer habitat requirements. M.S. Thesis. Univ. Missouri, Columbia.